

# ACTAAP

Arkansas Comprehensive Testing, Assessment, and Accountability Program

**RELEASED ITEM**

**BOOKLET**

**GRADE 5**

**AUGMENTED BENCHMARK EXAMINATION**

**April 2011**

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**Arkansas Department of Education**



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## Part I Overview—2011 Augmented Benchmark Grade 5

The criterion-referenced tests implemented as part of the Arkansas Comprehensive Testing, Assessment, and Accountability Program (ACTAAP) are being developed in response to Arkansas Legislative Act 35, which requires the State Board of Education to develop a comprehensive testing program that includes assessment of the challenging academic content standards defined by the Arkansas Curriculum Frameworks.

As part of this program, all grade 5 students in Arkansas public schools participated in the *Grade 5 Augmented Benchmark Examination* in April 2011.

This Released Item Booklet for the *Grade 5 Augmented Benchmark Examination* contains test questions or items that were asked of students during the April 2011 operational administration. The test items included in Part II of this booklet are some of the items that contributed to the student performance results for that administration.

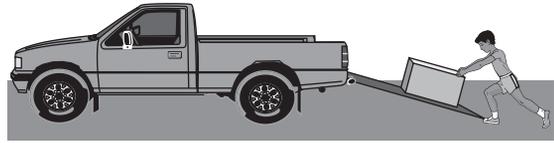
Students were given between two and three hours each day to complete assigned test sessions during the five days of testing in April 2011. Students were permitted to use a calculator for the mathematics items (both multiple-choice and open-response), with the exception of questions 1–3 in this Released Item Booklet (items 1–10 in the test booklet). Students were also supplied with a reference sheet to be used during the mathematics sessions so that all students would have equal access to this information during testing. (See the reference sheet on page 28 of this booklet.) All of the mathematics, reading, and science multiple-choice items within this booklet have the correct response marked with an asterisk (\*). The open-response questions for mathematics, reading, science, and the essay prompt for writing are listed with scoring guides (rubrics) immediately following. These rubrics provide information on the scoring model used for each subject, with the scoring model for writing defining the overall curricular and instructional link for that subject with the *Arkansas English Language Arts Curriculum Framework*. The domain scoring model, implemented within Arkansas for a number of years, illustrates the appropriate instructional approaches for writing within the state.

The development of the *Grade 5 Augmented Benchmark Examination* was based on the Arkansas Curriculum Frameworks. These frameworks have common distinct levels: Strands to be taught in concert, Content Standards within each Strand, and Student Learning Expectations within each Content Standard. Abridged versions of the *Arkansas Mathematics Curriculum Framework*, *Arkansas English Language Arts Curriculum Framework—Reading Strand*, *Arkansas English Language Arts Curriculum Framework—Writing Strand*, and *Arkansas Science Curriculum Framework* can be found in Part III of this booklet. It is important to note that these abridged versions list only the predominant Strand, Content Standard, and Student Learning Expectation associated with each item. However, since many key concepts within the Arkansas Curriculum Frameworks are interrelated, in many cases there are other item correlations or associations across Strands, Content Standards, and Student Learning Expectations.

Part III of the Released Item Booklet also contains a tabular listing of the Strand, Content Standard, and Student Learning Expectation that each question was designed to assess. The multiple-choice and open-response items found on the *Grade 5 Augmented Benchmark Examination* were developed in close association with the Arkansas education community. Arkansas teachers participated as members of Content Advisory Committees for each subject area, providing routine feedback and recommendations for all items. The number of items associated with specific Strands, Content Standards, and Student Learning Expectations was based on approximate proportions suggested by the Content Advisory Committee, and their recommendations were accommodated to the greatest extent possible given the overall test design. Part III of the Released Item Booklet provides Arkansas educators with specific information on how the *Grade 5 Augmented Benchmark Examination* items align or correlate with the Arkansas Curriculum Frameworks to provide models for classroom instruction.

- 1** Several insects are placed inside a sealed box for four hours. What will happen to the oxygen and carbon dioxide levels inside the box?
- A** Both oxygen and carbon dioxide levels will go up.
  - B** Both oxygen and carbon dioxide levels will go down.
  - C** Oxygen levels will go up, and carbon dioxide levels will go down.
  - \* **D** Oxygen levels will go down, and carbon dioxide levels will go up.

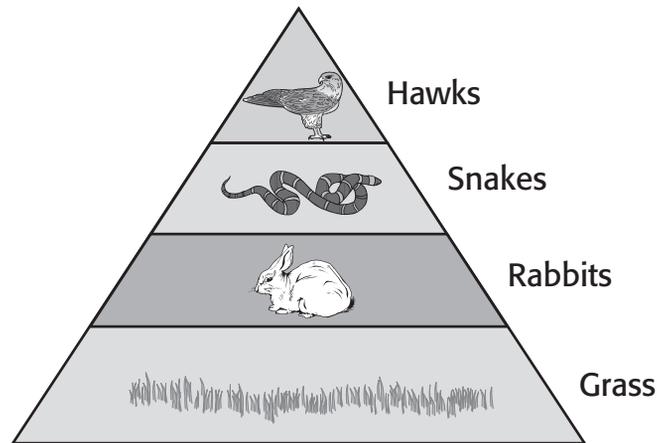
- 2** Dean is using a ramp to push a heavy box into the bed of a pickup truck.



Which of the following could Dean do to make it easier to push the box up the ramp?

- A** Use a taller box
  - B** Use a wider box
  - \* **C** Make the ramp longer
  - D** Make the ramp shorter
- 3** Martha wants to know if there is a difference between mass and weight.
- Which statement is correct to tell Martha?
- A** Mass and weight are the same.
  - B** Mass and weight change with motion.
  - \* **C** Mass measures the amount of matter in an object, and weight measures the force of gravity.
  - D** Weight measures the amount of matter in an object, and mass measures the force of gravity.

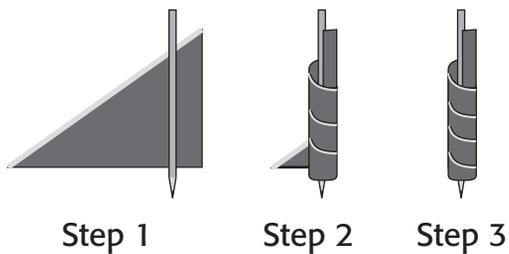
4 An energy pyramid is shown below.



Which organism in the energy pyramid shown gets its energy directly from photosynthesis?

- A The hawk
- B The snake
- C The rabbit
- \* D The grass

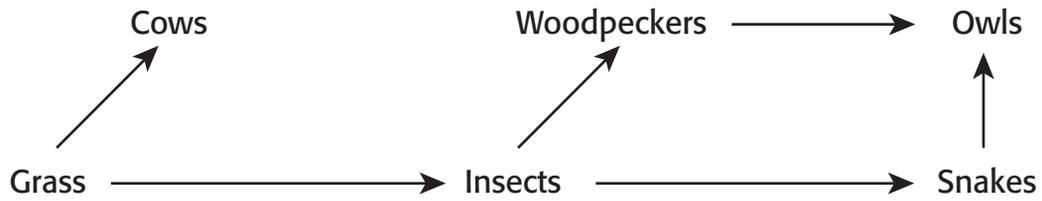
5 Karen is investigating simple machines. The pictures show each step of the model that Karen made.



What simple machine did she model?

- A Pulley
- \* B Screw
- C Lever
- D Wheel and axle

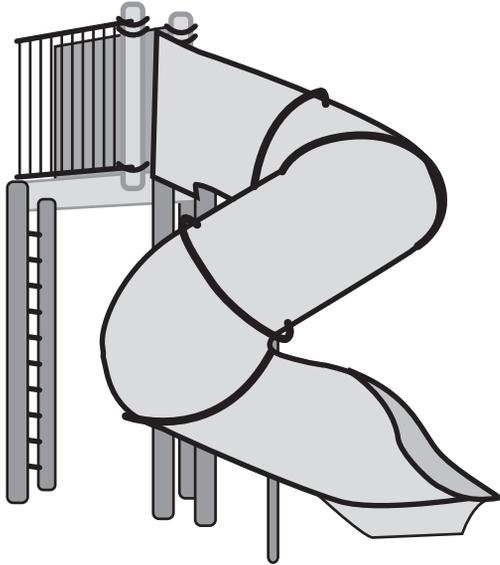
- 6 A food web diagram is shown below.



A farmer adds more cows to his farm, which causes overgrazing. Based on information in the food web, which statement correctly explains a likely result?

- A Snakes will increase because of a decrease in owls.
- B Insects will decrease because of an increase in grass.
- \* C Owls will decrease because of a decrease in woodpeckers.
- D Woodpeckers will increase because of an increase in insects.

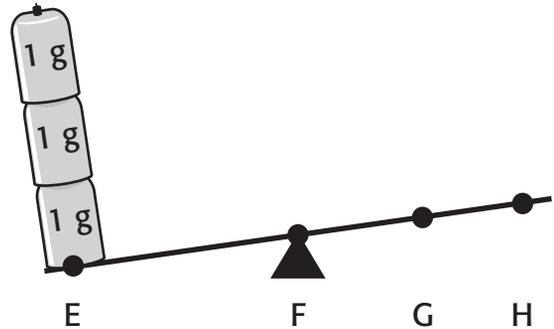
- 7** Simple machine concepts are used in many items. The diagram below represents a playground slide.



Which simple machine was used for the design of this playground slide?

- A** Lever
  - B** Pulley
  - \* **C** Inclined plane
  - D** Wheel and axle
- 8** Diamonds are made of which element?
- A** Iron
  - B** Silicon
  - \* **C** Carbon
  - D** Sodium

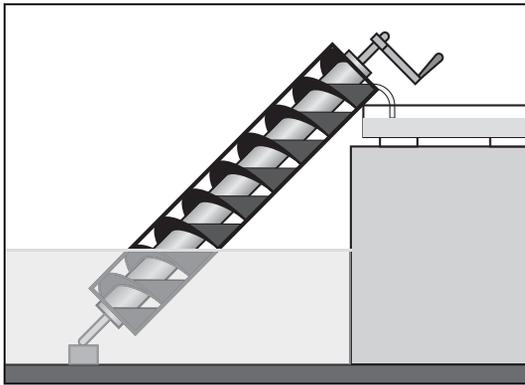
- 9** Tom is studying how levers can be used to lift weights. The picture below shows his investigation.



What could Tom do to balance the lever?

- A** Add three 1-g weights to point E
  - \* **B** Add three 1-g weights to point H
  - C** Move the fulcrum to point G
  - D** Move the three 1-g weights to point H
- 10** Which mineral is used to make aluminum?
- A** Quartz
  - B** Galena
  - \* **C** Bauxite
  - D** Diamond

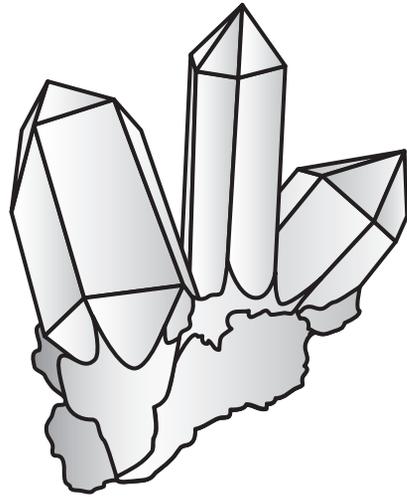
- 11** The Greek inventor Archimedes invented the machine shown below. This machine was used to raise water into irrigation ditches.



This invention is an example of which simple machine?

- A** Lever
- \* **B** Screw
- C** Pulley
- D** Wedge

- 12** A drawing of a mineral is shown below.



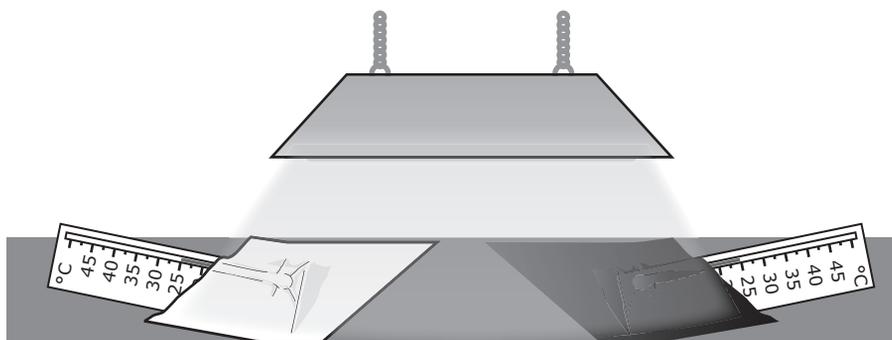
Which mineral is shown in the drawing?

- A** Halite
  - \* **B** Quartz
  - C** Hematite
  - D** Diamond
- 13** In the carbon dioxide-oxygen cycle, where do plants get carbon dioxide?
- \* **A** From air
  - B** From soil
  - C** From water
  - D** From minerals

**14** Selma and Liang are investigating how black and white cloths absorb heat energy from a lamp. They perform the following steps for their investigation.

- Place a black piece of cloth and a white piece of cloth under a lamp.
- Record the temperature of each cloth before turning on the lamp.
- Turn on the lamp and wait five minutes.
- Record the temperature of each cloth every five minutes for a total of fifteen minutes.

The data collected are shown below.



**Cloth Temperature**

Cloth Color	Beginning Temperature	After 5 minutes	After 10 minutes	After 15 minutes
White	25°C	25°C	26°C	26°C
Black	25°C	26°C	28°C	30°C

Based on the data, which statement is the **best** conclusion for this investigation?

- A** The color of the cloth has no effect on the rate the cloth absorbs heat.
- \* **B** Light-colored cloth absorbs heat more slowly than dark-colored cloth.
- C** Light-colored cloth absorbs heat more quickly than dark-colored cloth.
- D** The results were inaccurate, so no conclusion could be drawn from the data.

- 15** José studied a desert ecosystem. The table shows a list of organisms that he observed.

**Organisms in Desert Ecosystem**

Rattlesnake	Wildflower
Cactus	Eagle
Deer	Quail
Shrub	Coyote

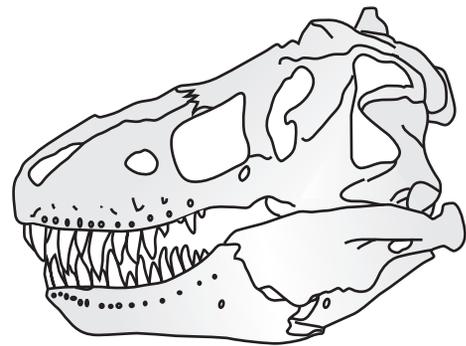
Which of the organisms are predators?

- A** Cactus, quail, deer
  - B** Deer, coyote, wildflower
  - \* **C** Rattlesnake, coyote, eagle
  - D** Wildflower, rattlesnake, shrub
- 16** A student studies how weathering helps to turn rocks into soil. Under which conditions will rocks weather the fastest?
- A** Under wet conditions with hot temperatures
  - B** Under dry conditions with cold temperatures
  - C** Under dry conditions with hot daytime and below-freezing nighttime temperatures
  - \* **D** Under wet conditions with hot daytime and below-freezing nighttime temperatures

- 17** Many power plants and factories release warm water into streams. As the temperature of the water in the streams increases, the amount of oxygen in the water decreases. The higher temperature also causes the rate of cellular respiration to go up for organisms that live in the streams.

Which effect is the **most** likely result of these changing water conditions?

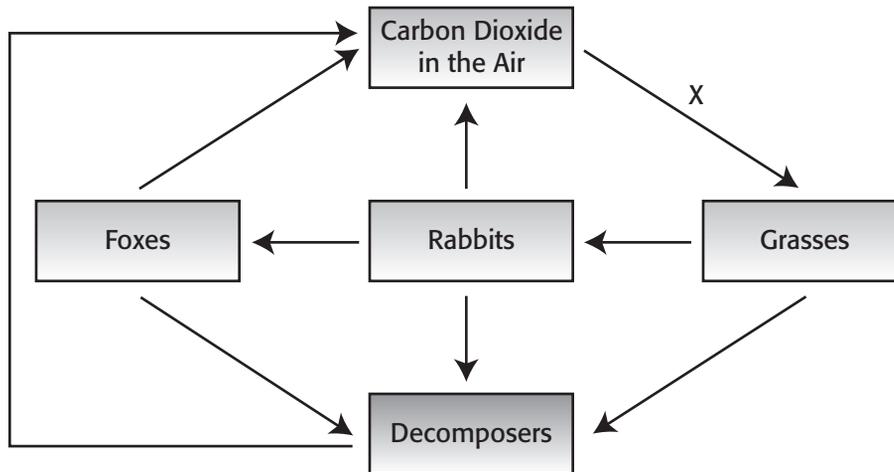
- A** Animals living near the streams will consume less food.
  - \* **B** The number of fish in the streams will decrease.
  - C** The number of aquatic plants in the streams will decrease.
  - D** Aquatic plants living in the streams will require less carbon dioxide.
- 18** The picture shows a fossil of a dinosaur.



What conclusion can you make about the dinosaur?

- A** It ate plants.
- B** It was a producer.
- \* **C** It ate other animals.
- D** It was a decomposer.

19 The diagram below shows an example of the carbon cycle.



Which is the correct label for the arrow marked with an “X”?

- A Decomposition
- \* B Photosynthesis
- C Energy From Prey
- D Respiration Into the Air

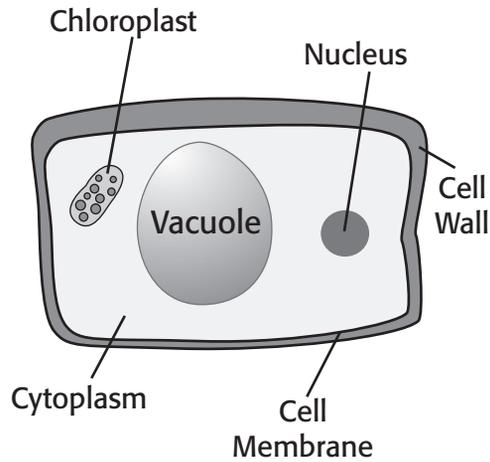
20 In the 16th century Nicolaus Copernicus proposed a model of the solar system that is still used today.

In this model, what object do the planets orbit?

- A Earth
- \* B The Sun
- C The Moon
- D The Milky Way

Science Item A—2011 Grade 5

**A** The picture shows a close-up view of a cell.



1. What tool is used to get a close-up view of cells?
2. Is this a plant cell or an animal cell?
3. Provide two clues that helped you identify the type of cell.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

<b>Science Item A Scoring Rubric—Grade 5</b>
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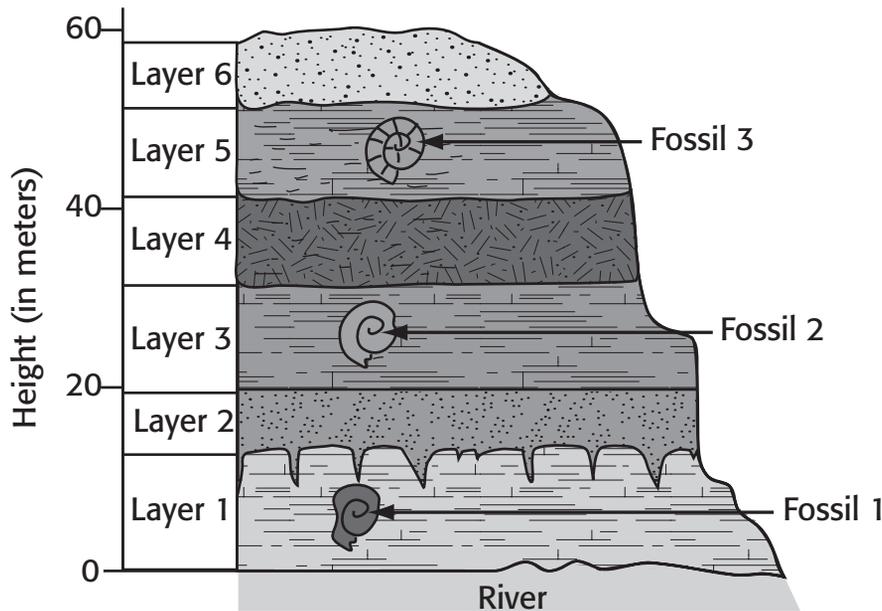
Score	Description
4	The student earns 4 points. The response shows a complete understanding of the similarities and differences between plant and animal cells. The response correctly addresses four out of the four tasks with no errors.
3	The student earns 3 points. The response shows a nearly complete understanding of the similarities and differences between plant and animal cells. The response correctly addresses three out of the four tasks.
2	The student earns 2 points. The response shows a limited understanding of the similarities and differences between plant and animal cells. The response correctly addresses two out of the four tasks.
1	The student earns 1 point. The response shows a minimum understanding of the similarities and differences between plant and animal cells. The response correctly addresses one out of the four tasks.
0	The student earns 0 points. The response shows insufficient understanding of the similarities and differences between plant and animal cells. The response, if any, contains major errors or may be entirely irrelevant or incoherent.
B	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” is assigned for the item.)

### Solution and Scoring

Part	Points
1	<b>1 point possible</b> <ul style="list-style-type: none"> <li>• 1 point for identifying a microscope.</li> </ul>
2	<b>1 point possible</b> <ul style="list-style-type: none"> <li>• 1 point for correctly recognizing that the cell is a plant cell.</li> </ul>
3	<b>2 points possible</b> <ul style="list-style-type: none"> <li>• 1 point each for identifying that two of the following structures are unique to plant cells. (Cell wall or Large Vacuole or Chloroplast)</li> </ul>

## Science Item B—2011 Grade 5

- B** The diagram below represents a cliff along a river. Several rock layers make up this cliff.



1. Which of the six rock layers is the oldest? Explain why.
2. Which of the three fossils is the youngest? Explain why.
3. Provide one explanation on how the fossil remains of an animal that lived in water are now found high on a cliff in a dry area.
4. Provide another explanation on how the fossil remains of an animal that lived in water are now found high on a cliff in a dry area.

BE SURE TO LABEL YOUR RESPONSES 1, 2, 3, AND 4.

<b>Science Item B Scoring Rubric—Grade 5</b>
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Score	Description
4	The student earns 4 points. The response shows a complete understanding of fossil record evidence. The response correctly addresses four out of the four tasks with no errors.
3	The student earns 3 points. The response shows a nearly complete understanding of fossil record evidence. The response correctly addresses three out of the four tasks.
2	The student earns 2 points. The response shows a limited understanding of fossil record evidence. The response correctly addresses two out of the four tasks.
1	The student earns 1 point. The response shows a minimum understanding of fossil record evidence. The response correctly addresses one out of the four tasks.
0	The student earns 0 points. The response shows insufficient understanding of fossil record evidence. The response, if any, contains major errors or may be entirely irrelevant or incoherent.
B	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” is assigned for the item.)

### Solution and Scoring

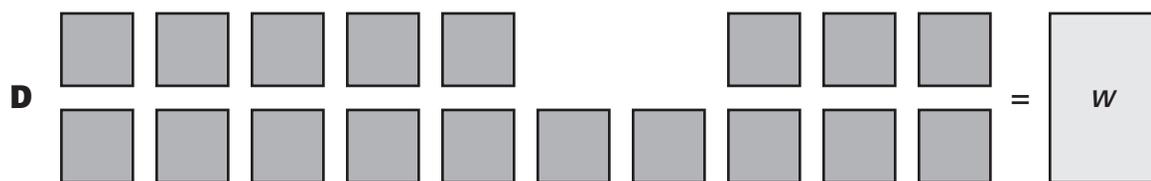
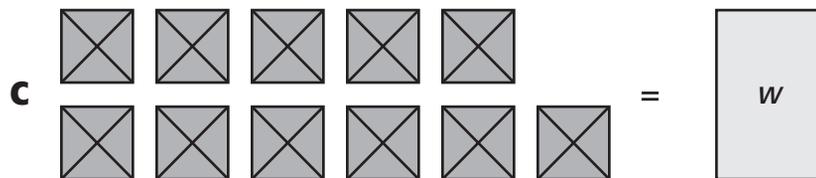
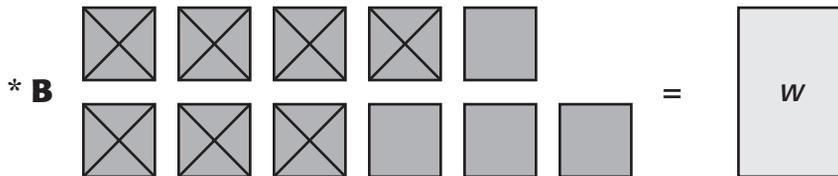
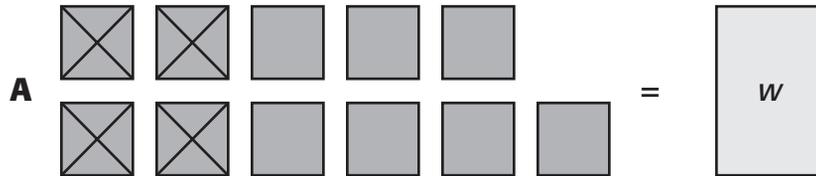
Part	Points
1	<b>1 point possible</b> <ul style="list-style-type: none"> <li>• ½ point for correctly identifying Layer 1 as the oldest rock layer.</li> <li>• ½ point for correctly explaining why Layer 1 is the oldest.</li> </ul>
2	<b>1 point possible</b> <ul style="list-style-type: none"> <li>• ½ point for correctly identifying Fossil 3 as the youngest fossil.</li> <li>• ½ point for correctly explaining why Fossil 3 is the youngest fossil.</li> </ul>
3	<b>1 point possible</b> <ul style="list-style-type: none"> <li>• 1 point for providing a reasonable explanation on why fossils of aquatic animals are now found in a dry area.</li> </ul>
4	<b>1 point possible</b> <ul style="list-style-type: none"> <li>• 1 point for providing a second reasonable explanation on why fossils of aquatic animals are now found in a dry area.</li> </ul>

CALCULATOR NOT PERMITTED—ITEMS 1–3



1 Which model represents the equation shown?

$$11 - 7 = w$$



- 2** Members of a club listed their ages.

8, 13, 10, 12, 12, 9, 12

Based on the data, which age is most likely for a new member of the club?

- A** 5
- B** 7
- \* **C** 11
- D** 15

- 3** Which unit of measure would best describe the weight of a refrigerator?

- A** Fluid ounces
- B** Quarts
- C** Inches
- \* **D** Pounds

## CALCULATOR PERMITTED—ITEMS 4–20 and A–C



- 4** On Monday the softball team had  $x$  number of players come to practice. On Tuesday there were twice as many players at practice.

If there were 24 players at practice on Tuesday, which expression has a value equal to the number of players at Monday's practice?

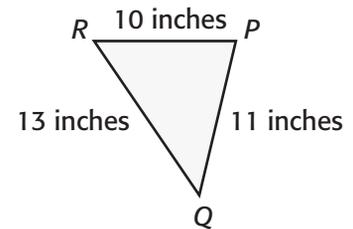
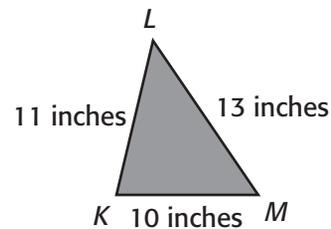
- \* **A**  $24 - x$
- B**  $24 + x$
- C**  $24x$
- D**  $24 \div x$

- 5** Charles is creating a survey to determine the different pets owned by students in his class.

Which question is most appropriate for Charles's survey?

- A** What pets are the best?
- \* **B** What type of pet do you own?
- C** Why are dogs the best pets to own?
- D** Why should you own a cat?

- 6** Triangle  $KLM$  is congruent to triangle  $PQR$ .



Which pair of angles is congruent?

- A**  $\angle K$  and  $\angle Q$
- B**  $\angle M$  and  $\angle P$
- \* **C**  $\angle L$  and  $\angle Q$
- D**  $\angle K$  and  $\angle R$

- 7** Kyle's dad wants to put carpet in Kyle's bedroom. He measures to find how many square feet the floor is in order to buy the carpet he needs. What is Kyle's dad measuring?

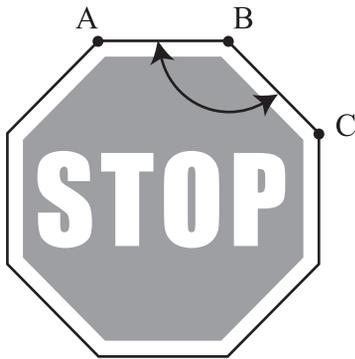
- \* **A** area
- B** angle
- C** volume
- D** perimeter

- 8** Kent bowled five games. He predicts the score of the next game he bowls will be 120.

Which list most likely shows the scores of Kent's first five games?

- A** 95, 102, 128, 112, 103
- B** 104, 187, 168, 154, 173
- C** 120, 149, 157, 136, 162
- \* D** 114, 115, 127, 116, 128

- 9** Which is the best estimate of the measure, in degrees, of angle ABC in the stop sign below?



- A** 45°
- B** 90°
- \* C** 135°
- D** 180°

- 10** Elizabeth recorded the total number of apples in different-sized bags at the store.

**Apples in Each Bag**

Weight (pounds)	Number of Apples
1	3
2	6
3	?
4	12
5	15

According to the pattern in the table, which is the total number of apples in a 3-pound bag?

- A** 6
- B** 7
- \* C** 9
- D** 12

- 11** Sandra used a dropper to give her puppy one dose of liquid medicine. Which unit should she use to measure the amount of liquid in one dose?

- A** Kilogram
- \* B** Milliliter
- C** Centimeter
- D** Liter

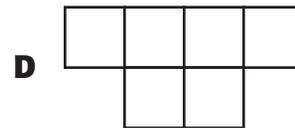
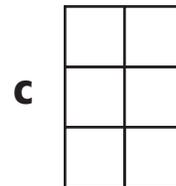
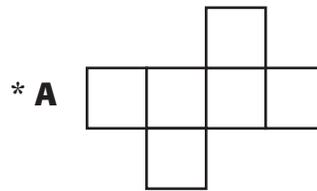
**12** Carl's favorite part of camping is going out in a canoe. The camp has 6 red canoes and 8 green canoes. If Carl is randomly assigned a canoe, what is the probability that he will be assigned a red canoe?

- A** 6 out of 8
- B** 8 out of 6
- \* **C** 6 out of 14
- D** 8 out of 14

**13** Which describes a quantity that changes daily?

- A** The number of pennies in a dollar
- B** The number of donuts in a dozen
- C** The number of minutes in an hour
- \* **D** The number of cartons of milk in the school refrigerator

**14** Which net can be folded into a cube?



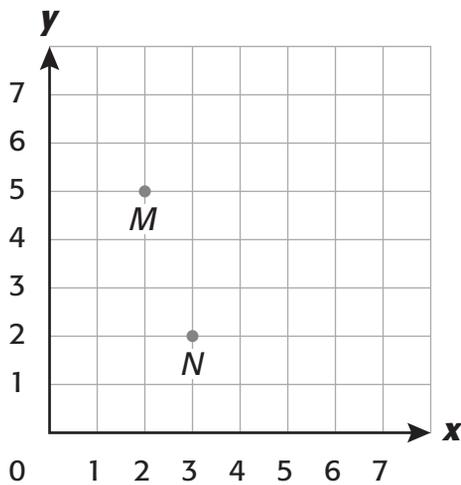
**15** James filled a box with sand. Which term describes the amount of sand needed to fill the box?

- A** Area
- B** Perimeter
- C** Surface Area
- \* **D** Volume

**16** Hugh is 5 years younger than his 14-year-old sister, Beth. If  $n$  represents Beth's age in the future, which expression would represent Hugh's age at the same time?

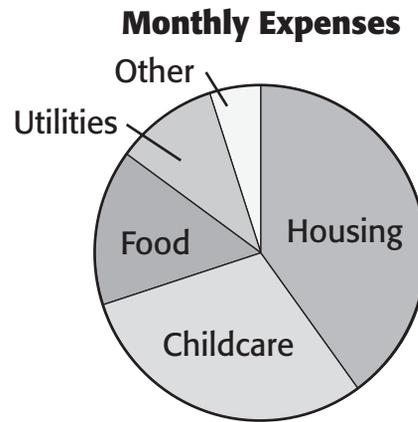
- A**  $5 - n$
- B**  $5 \div n$
- \* **C**  $n - 5$
- D**  $n \div 5$

**17** Which pair of ordered pairs represents point  $M$  and point  $N$ ?



- A**  $M(5, 2)$  and  $N(3, 2)$
- \* **B**  $M(2, 5)$  and  $N(3, 2)$
- C**  $M(2, 5)$  and  $N(2, 3)$
- D**  $M(5, 2)$  and  $N(2, 3)$

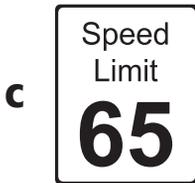
**18** The circle graph represents a family's monthly expenses.



Which two expenses, when added together, are the closest to 50% of the family's monthly expenses?

- \* **A** Housing and Utilities
- B** Childcare and Other
- C** Food and Utilities
- D** Food and Other

19 Which street sign is a pentagon?

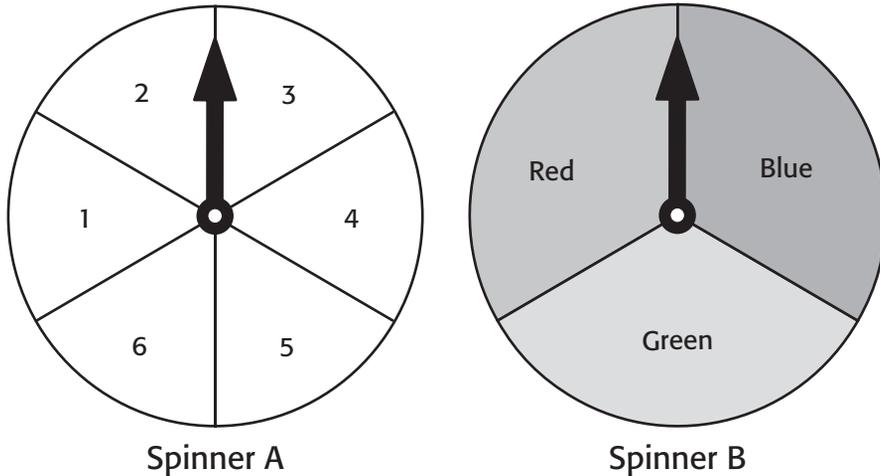


20 At 5:55 P.M. David's dad says that the family can go to a movie that starts at 7:10 P.M. How much time do they have to wait until the movie starts?

- A 15 minutes
- B 65 minutes
- \* C 1 hour and 15 minutes
- D 2 hours and 15 minutes

Mathematics Item A—2011 Grade 5

- A** Mrs. Breen used the spinners shown to play a game with her students. Each spinner is divided into equal-sized sections.



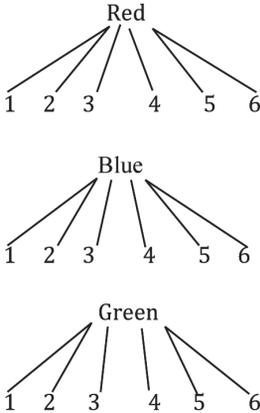
1. In your Student Answer Document, list all outcomes that are possible from spinning both spinners at the same time.
2. What is the total number of outcomes that are possible?
3. Mrs. Breen decides to add a fourth color to Spinner B, keeping the sections of equal size. What is the total number of outcomes if Spinner A and the new Spinner B are spun?

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

Mathematics Item A Scoring Rubric—2011 Grade 5

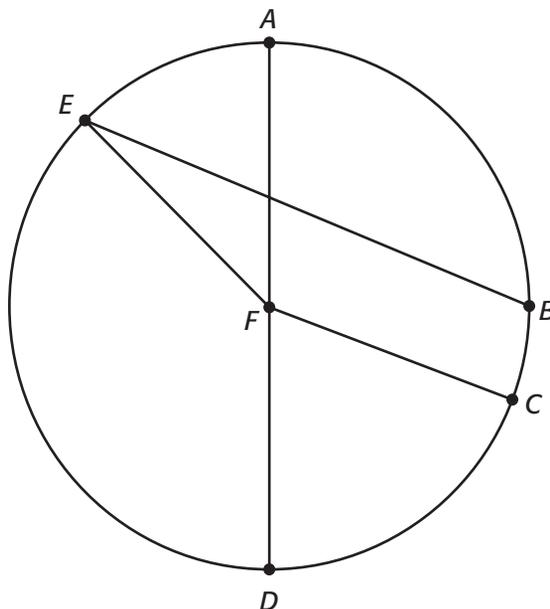
Score	Description
4	The student earns 4 points. The response contains no incorrect work.
3	The student earns 3 points.
2	The student earns 2 points.
1	The student earns 1 point, or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” is assigned for the item.)

## Solution and Scoring

Part	Points
1	<p><b>2 points possible</b>            2 points: <b>Correct and complete list of all 18 possible outcomes with no repeats.</b>            Give credit for the following or equivalent:            Ex. R1,R2,R3,R4,R5,R6,B1,B2,B3,B4,B5,B6,G1,G2,G3,G4,G5,G6            Ex.</p> <div style="text-align: center;">  </div> <p>Ex. Red 1-6 Blue 1-6 Green 1-6 (with a correct answer of 18 in part 2)</p> <p><b>OR</b></p> <p>1 point: <b>• A correct list of the possible 18 outcomes with repeats.</b>  <b>or</b>  <b>• A correct list of at least 12 of the possible 18 outcomes.</b>  <b>or</b>  <b>• A correct list for 1 color with correct procedure for other colors.</b>            Ex. "R1,R2,R3,R4,R5,R6 and the same for blue and green"</p>
2	<p><b>1 point possible</b>            1 point: <b>Correct answer: 18 outcomes</b></p>
3	<p><b>1 point possible</b>            1 point:</p> <ul style="list-style-type: none"> <li><b>• Correct answer: 24 outcomes</b></li> <li><b>or</b></li> <li><b>• An outcome of 6 more based on an incorrect answer in part 2.</b></li> </ul>

<b>Mathematics Item B—2011 Grade 5</b>
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- B** Mr. Thomas drew circle  $F$  and labeled the points and line segments as shown.



1. Name 2 line segments that are chords of circle  $F$ .
2. Which is the longest chord of circle  $F$ ? Use words, numbers, and/or pictures to explain how you determined your answer.
3. What point on the circle must be included to name a radius? Use words, numbers, and/or pictures to explain how you determined your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

<b>Mathematics Item B Scoring Rubric—2011 Grade 5</b>
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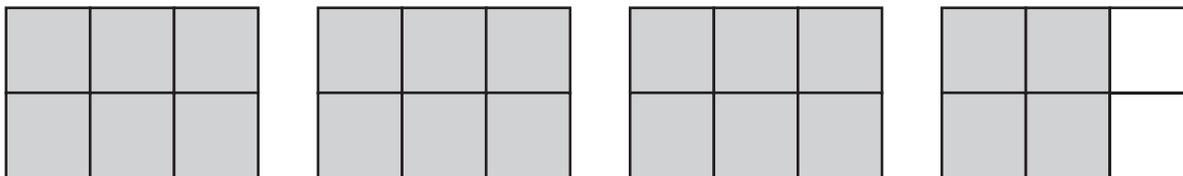
Score	Description
4	The student earns 4 points. The response contains no incorrect work.
3	The student earns 3–3½ points.
2	The student earns 2–2½ points.
1	The student earns ½–1½ points, or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
<b>B</b>	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” is assigned for the item.)

## Solution and Scoring

Part	Points
1	<p><b>1 point possible</b></p> <p>1 point: <b>Correct answer:</b> <math>\overline{AD}</math> and <math>\overline{EB}</math> (correct segment notation is not required)</p> <p><b>OR</b></p> <p>½ point: <b>1 correct answer:</b> <math>\overline{AD}</math> or <math>\overline{EB}</math></p> <p><b>Note: No credit is given if more than 1 incorrect answer is included.</b></p>
2	<p><b>1½ points possible</b></p> <p>1½ points: <b>Correct answer:</b> <math>\overline{AD}</math></p> <p><b>Correct procedure shown and/or explained.</b></p> <p>Give credit for the following or equivalent:</p> <p>Ex: “<math>\overline{AD}</math> It’s the diameter and the diameter is the longest chord”</p> <p>Ex: “<math>\overline{AD}</math> because it goes thru the middle”</p> <p><b>OR</b></p> <p>1 point: • <b>Correct answer:</b> <math>\overline{AD}</math></p> <p><b>Incorrect or no procedure is shown and/or explained</b></p> <p><b>or</b></p> <p>• <b>Incorrect or no line segment is given.</b></p> <p><b>Correct procedure shown and/or explained</b></p>
3	<p><b>1½ points possible</b></p> <p>1½ points: <b>Correct answer:</b> Point F.</p> <p><b>Correct procedure shown and/or explained.</b></p> <p>Give credit for the following or equivalent:</p> <p>Ex: “Point F is the center and the radius goes from the center to the circle”</p> <p>Ex: “Point F is in the middle”</p> <p><b>OR</b></p> <p>1 point: • <b>Correct answer:</b> Point F</p> <p><b>Procedure is incomplete, incorrect or missing</b></p> <p><b>or</b></p> <p>• <b>Answer is incorrect or missing.</b></p> <p><b>Correct procedure is shown and/or explained</b></p> <p><b>OR</b></p> <p>½ point: <b>A correct radius is given:</b> <math>\overline{AF}</math> and/or <math>\overline{CF}</math> and/or <math>\overline{DF}</math> and/or <math>\overline{EF}</math></p> <p><b>Note: No credit is given if an incorrect radius is included.</b></p>

<b>Mathematics Item C—2011 Grade 5</b>
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**C** The picture shown represents a mixed number.



1. What is a mixed number that is being represented above? Show all your work and/or explain your answer.
2. Can your answer in Part 1 be simplified? Explain your reasoning using words, numbers, and/or pictures.
3. Write an improper fraction that is equivalent to this mixed number. Show all your work and/or explain your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

<b>Mathematics Item C Scoring Rubric—2011 Grade 5</b>
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Score	Description
4	The student earns 5 points. The response contains no incorrect work.
3	The student earns 3–4½ points.
2	The student earns 2–2½ points.
1	The student earns ½–1½ points, or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
<b>B</b>	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” is assigned for the item.)



Part	Points
2	<p><b>1 point possible</b> 1 point: <b>Correct answer</b> <b>Correct procedure shown and/or explained</b> Give credit for the following or equivalent: <b><u>Note: Answer and/or procedure may be based on an incorrect fraction in Part 1.</u></b></p> <p>Ex.: (with answer of <math>3\frac{4}{6}</math> in Part 1) “Yes it can be simplified because both 4 and 6 can be divided by 2.”</p> <p>Ex.: (with answer of <math>3\frac{4}{6}</math> in Part 1) “<math>3\frac{4}{6} = 3\frac{2}{3}</math> because <math>\frac{4 \div 2}{6 \div 2} = \frac{2}{3}</math>”</p> <p>Ex.: (with answer of <math>3\frac{2}{3}</math> in Part 1) “No because 2 and 3 do not have a common factor other than 1.”</p> <p>Ex.: (with an incorrect answer Part 1) “<math>\frac{22}{24}</math> can be divided by 2 over 2 and reduced to <math>\frac{11}{12}</math>.”</p> <p><b>OR</b> <math>\frac{1}{2}</math> point: <b>• Correct simplification of answer in Part 1.</b> Ex.: answer of <math>3\frac{2}{3}</math> <b>or</b> <b>• Correct answer yes or no based on Part 1.</b></p>
3	<p><b>2 points possible</b> 2 points: <b>Correct answer:</b> <math>\frac{22}{6}</math> or <math>\frac{11}{3}</math> <b>(or correct improper fraction based on an incorrect fraction in Part 1.)</b> <b>Correct procedure shown and/or explained.</b> Give credit for the following or equivalent: Ex.: “<math>6 \times 3 = 18 + 4 = 22</math>” Ex.: “<math>3 \times 3 = 9 + 2 = 11</math>” Ex.: “<math>3\frac{4}{6} = \frac{22}{6}</math>”</p> <p><b>OR</b> 1 point: <b>• Correct answer:</b> <math>\frac{22}{6}</math> or <math>\frac{11}{3}</math> <b>(or correct improper fraction based on an incorrect fraction in Part 1.)</b> <b>Procedure is incomplete, incorrect or missing</b> <b>or</b> <b>• Answer is incorrect due to a calculation, counting, or copy error.</b> <b>Correct procedure is shown and/or explained.</b></p>

Copying this page is a breach of security.

## Mathematics Reference Sheet Grade 5

*Use the information below, as needed, to answer questions on the Mathematics test.*

<b>Square</b>	<b>Rectangle</b>	<b>Triangle</b>
Area = $s \times s$ Perimeter = $4 \times s$	Area = $l \times w$ Perimeter = $(2 \times l) + (2 \times w)$	Perimeter = $a + b + c$

1 foot = 12 inches

1 yard = 3 feet

1 mile = 5,280 feet

1 pound (lb) = 16 ounces (oz)

1 cup = 8 ounces (oz)

1 pint = 2 cups

1 quart = 2 pints

1 gallon = 4 quarts

1 kilogram = 1000 grams

1 meter = 100 centimeters

1 centimeter = 10 millimeters

1 kilometer = 1000 meters

1 liter = 1000 milliliters



Read the passage. Then answer multiple-choice questions 1 through 8 and open-response question A.

## How Grape Jelly Is Made

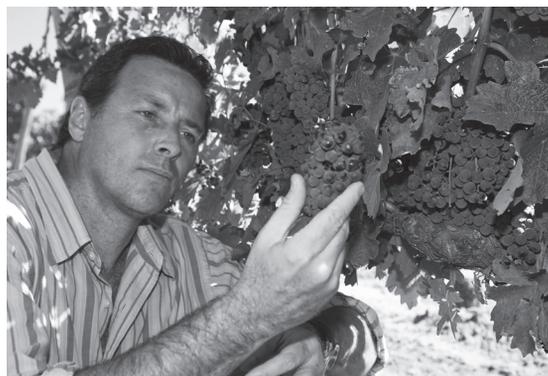
by George Jones

There has never been a team like peanut butter and jelly. They stick together through thick and thin. In fact, jelly got its name from being thick and sticky. It comes from the French word *gelée*, which means thickened. Jelly can be made out of many kinds of fruit. Grape jelly is one of the most popular jellies in the United States.

1. The dark purple color and special flavor of grape jelly come from Concord grapes, which are grown mainly in New York, Pennsylvania, Michigan, and Washington. Grapes grow in bunches on vines. Grape farms are called vineyards.

2. Grapes are harvested in the fall, when they are sweet and juicy. They are so ripe that they fall right off their stems when a machine called a harvester shakes the vines.

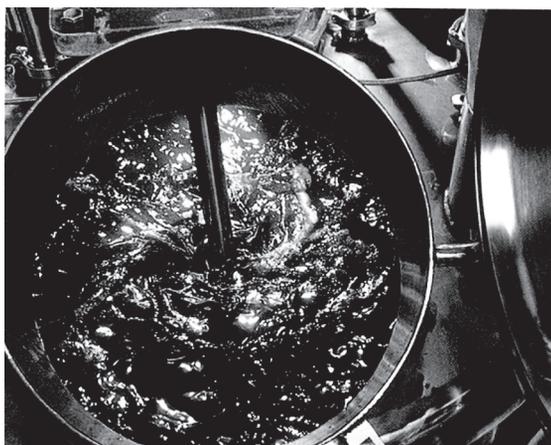
3. The grapes fall into long troughs on the harvester and then drop



from a tube at the side of the machine into large crates. Each full crate weighs as much as two cars. Farm workers operate the harvester and make sure to stop the machine when the crate is full.

4. Truck drivers take the crates to the jelly factory. First, an inspector looks carefully at samples of the grapes to be sure they are ripe. Then a forklift operator lifts each crate of grapes from the unloading area and empties it into a long rectangular funnel called a hopper.

5. The hopper funnels the grapes into pipes that flow into a room inside the jelly factory. As the grapes are pumped through the pipes, they begin to get crushed. Then paddles push them through holes just big enough for grapes and juice to flow through. Stems and leaves are left behind. The crushed grapes flow into a big vat.<sup>1</sup>



6. As the grapes are heated in the vat, they get softer—so the juice separates easily from the skins and seeds. The mixture is forced through a dejuicer or filter, which lets only the juice through. This time the skins and seeds are left behind. Then the juice is heated until it almost boils, and quickly chilled until it almost freezes. This process, called pasteurization, completely kills any germs that might have been in the juice.

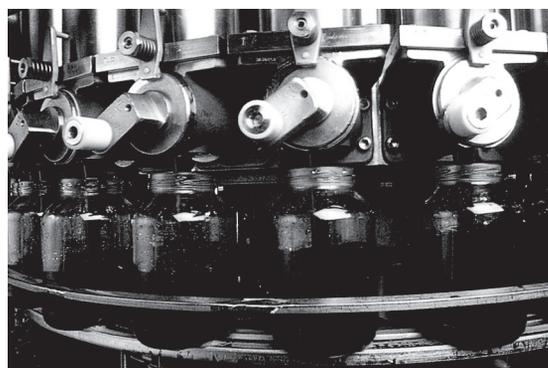
7. The grape juice is kept cold in refrigerated 700,000-gallon tanks until it is time to make a batch of jelly. Then the juice is pumped from the tanks into

big kettles to be cooked three times. Sugars and pectin are added to make it thicker. A worker uses a dipper to check the thickness.



8. The jelly goes into a finishing kettle for the last stage of cooking. While the jelly is still hot, it is pumped from the kettle to the filler and into jelly jars in exactly measured amounts.

9. The jars must have nothing but jelly inside of them—not even air! Germs from the air could make the jelly unsafe to eat. When a cover is put on top of each jar, the air is sucked out in a process called vacuum sealing.



<sup>1</sup>vat: large container for storing liquids

10. As the jars full of jelly are carried along an assembly line, machines brush paste and wrap a label around each one. The label tells the flavor of the jelly, who made it, every ingredient in it, and the jelly's nutritional facts.

11. Before the jelly leaves the factory, workers test samples from random jars in each batch for taste and color. Machines also test samples to make sure that no air is sealed in the jars.

12. If the jelly passes all the tests, the jars are packed in cardboard boxes with sheets of cardboard between them so they won't bump and break. The boxes are loaded onto trucks and shipped to stores. The jelly is ready to meet its partner—peanut butter—on the other side of the sandwich.

**1** What causes the grapes to fall off the vines during harvest?

- A** Winds blow the ripened grapes from the vines.
- \* **B** A machine shakes the vines so the grapes will fall.
- C** A funnel pushes the grapes off the vines into a crate.
- D** Workers use a hand tool to push the grapes off the vines.

**2** Based on information in step 3 of the passage, a reader can tell that troughs are used for —

- \* **A** collecting
- B** pumping
- C** juicing
- D** mixing

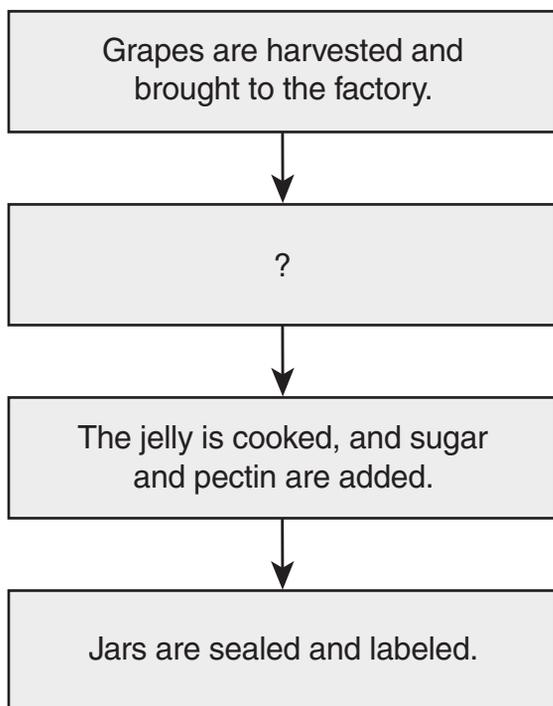
**3** During which step are the stems and leaves removed from the grapes?

- A** Step 3
- B** Step 4
- \* **C** Step 5
- D** Step 6

**4** Based on information in the passage, what can a factory worker do if a jelly batch is too thin?

- A** Chill the mixture longer
- B** Add more juice
- C** Put the mixture in the dejuicer
- \* **D** Add more pectin

- 5 Below are the main steps for how grape jelly is made.



Which step **best** completes the graphic organizer?

- A Glue is put on the clean jars.
- B The hot mixture is measured and put into jars.
- \* C The grapes are crushed and filtered.
- D Each crate of grapes is weighed and put onto a truck.

- 6 Which sentence from the passage includes an opinion?

- \* A “There has never been a team like peanut butter and jelly.”
- B “Jelly can be made out of many kinds of fruit.”
- C “Truck drivers take the crates to the jelly factory.”
- D “The jelly goes into a finishing kettle for the last stage of cooking.”

- 7 Which question is answered by the information in step 7?

- A When does grape jelly go into jars?
- \* B How does grape jelly get its thickness?
- C What does the inspector do at the jelly factory?
- D When does the jelly go into the finishing kettle?

- 8 How is **most** of the information in the passage organized?

- A By using cause and effect
- B By describing important events
- C By comparing two ideas
- \* D By including a series of steps

<b>Reading Item A—2011 Grade 5</b>
------------------------------------

- A** Use at least four details from the passage to explain what must happen once the jars are filled with jelly.

<b>Reading Item A Scoring Rubric—2011 Grade 5</b>
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Score	Description
4	The response provides at least four accurate and relevant details from the passage to explain what must happen once the jars are filled with jelly.
3	The response provides three accurate and relevant details from the passage to explain what must happen once the jars are filled with jelly.
2	The response provides two accurate and relevant details from the passage to explain what must happen once the jars are filled with jelly.
1	The response provides one accurate and relevant detail from the passage to explain what must happen once the jars are filled with jelly. <b>OR</b> The response demonstrates minimal understanding of the question.
0	The response is incorrect or irrelevant.
B	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” is assigned for the item.)

*Read the passage. Then answer multiple-choice questions 9 through 16 and open-response question B.*

## **Cooking by the Numbers**

by J.P. Russell

1 “Cooking contests are for girls!”

2 I didn’t mean to shout. But how would you feel if your best friend woke you up on a Saturday morning, carrying a grocery sack and wearing an apron dotted with smiley faces?

Hayden dropped a bag of flour onto my stomach. “Not true, Rick. Most of America’s great cooks are men.” He patted his pocket. “I have the numbers to prove it.”

Ever since Hayden had run for class president and lost, he had become a big fan of polls. Last week, he polled students in the cafeteria to find out how many of them thought lemon sours were fruit. Now he dug a wrinkled paper from his pocket and read:

“Fifty-six percent of women chose a male chef as their favorite TV cook. Sixty-seven percent of women eat at restaurants where men wear white floppy hats. And ninety-nine percent of married women wish their husbands would cook dinner.”

He grinned. “Not even Spider-Man gets those numbers, Rick.”

As I struggled to sit up, the flour bag thudded onto the floor. A white cloud puffed into my face.

Coughing, I sputtered, “You made that up.”

Hayden thumped my back. “Nope. Found it on a Web site. In fact, I’m thinking about posting my own poll results.”

I snorted. “Right. Like people care what color hair gel our classmates use. What do those numbers have to do with winning the contest, anyway?”

Hayden sighed and began ticking answers off on his fingers. “It’s a Women’s Club contest, so the judges must be women. Most of the contestants will be women. Women prefer men who cook—I’m a man.” He paused, then curled his third finger down again. “OK, I’m a boy. But I have a winning recipe.”

He turned the paper over and read: “Women’s top-five sweets.”

I studied the scrawled words: *Hot fudge. Sugared dates. Butterscotch. Candied peaches. Chocolate.* “You’re putting all those in one recipe?”

He nodded smugly. “Giant brownies. Tucker’s Temptations.”

15 *More like Hayden’s Half-Baked Hope*, I thought. “When is the contest?” I asked.

“This morning.”

My ears had taken a nap. “Today morning? Or tomorrow morning?”

“Today morning. Ten o’clock. At the Channel 10 studio.”

I tried to dive back under the covers, but Hayden grabbed my arm. “If I win, half the prize is yours. Now get dressed.”

Minutes later, we locked our bikes outside the TV studio. A woman with spiky black hair met us inside. She glanced at Hayden’s apron. “Name?”

“Hayden Tucker, soon to be famous for Tucker’s Temptations,” Hayden said.

She checked her clipboard. “T . . . Tucker. OK. Good luck.”

As we entered the contestant kitchen, I stopped. Our luck definitely wasn’t good. Hayden bumped into me. “Watch it—”

I pointed at the judges’ table.

“Men!” Hayden gasped. “Nobody has ever done a poll on male cooking judges.”

I was busy reading a nearby sign. “Uh, Hay, how much do you know about this contest?”

“What I heard through my mom’s cooking club. Why?”

“Missed the part about vegetarian dinner recipes, huh?”

Hayden’s face turned tomato red. “Vege . . . vege . . . ,” he stammered.

“*Vegetarian . . . as in with vegetables,*” I explained. “*Dinner . . . as in before dessert.*”

Just then the spiky-haired woman rushed past. “On air in ten.”

Her voice jolted Hayden into action. Slinging the grocery sack over his shoulder, he headed to his workspace. “We can win this.”

33 “But your recipe doesn’t use vegetables,” I protested.

“Says you,” he argued, “but fifty-eight percent of sixth-graders in my To Eat or Not to Eat poll said that dates are vegetables. They won’t touch them.”

The next hour was a blur—mostly because of the flour cloud Hayden stirred up as he mixed, pounded, and shaped his new creation.

As the judges approached, he whispered, “Remember—you get half the prize.”

I snickered. I was one hundred percent sure that Hayden had no idea that the prize was a designer apron-and-mitt set.

“What’s on the menu?” the head judge asked, smiling.

“I call it Luscious Loaf,” Hayden announced as he offered each man a slice.

“Surprising,” said one judge, chewing slowly.

“Interesting texture,” muttered another.

“Water . . .,” gasped a third.

They hurried away, leaving Hayden with a plate of half-eaten loaf slices.

Later, when Tangy Asparagus Souffle won, Hayden didn’t seem too disappointed. As I watched, he wiped his hands on his apron and loaded a new tray with Luscious Loaf.

“I really should congratulate the winner,” Hayden said, “and ask the other contestants a few questions.” He picked up the tray and headed toward them.

I laughed and followed him. I knew we wouldn’t be going home soon. Because there was only one thing Hayden Tucker liked better than entering contests . . . and that was conducting polls.



- 9 Which word **best** describes Rick’s attitude in paragraphs 1 and 2?
- \* A Annoyed
  - B Positive
  - C Uncertain
  - D Eager
- 10 Which quotation from the passage shows Hayden is confident he can win the contest?
- A “‘Not true, Rick. Most of America’s great cooks are men.’”
  - B “‘In fact, I’m thinking about posting my own poll results.’”
  - \* C “‘Hayden Tucker, soon to be famous for Tucker’s Temptations’. . . .”
  - D “‘Nobody has ever done a poll on male cooking judges.’”
- 11 Based on his thoughts in paragraph 15, Rick **most** likely believes that —
- A half the people who enter the contest have a chance of winning
  - \* B Hayden has only a small chance of winning the contest
  - C Hayden will become a famous television chef someday
  - D there may only be enough time to bake half the brownies
- 12 Which word is closest in meaning to protested as it is used in paragraph 33?
- A Attempted
  - \* B Objected
  - C Determined
  - D Offered
- 13 Even though he loses, Hayden is **most** likely content at the end of the passage because he —
- A realizes the prize would be difficult to split
  - B learns how to make a new recipe
  - \* C conducts a poll of the people at the contest
  - D realizes the judges enjoyed his dish
- 14 Which statement about cooking can be supported by details in the passage?
- A Cooking is becoming more popular for children.
  - B Most cooking shows are watched on weekends.
  - C More people are cooking vegetarian dinners.
  - \* D Cooking can be for both males and females.

- 15** Which sentence from the passage contains figurative language?
- A** “He patted his pocket.”
  - B** “ ‘But I have a winning recipe.’ ”
  - \* **C** “Hayden’s face turned tomato red.”
  - D** “ ‘You’re putting all those in one recipe?’ ”

- 16** How does the author of the passage give readers information about Hayden and Rick?
- \* **A** By showing them talking with each other
  - B** By explaining the foods they like to eat
  - C** By showing them competing with each other
  - D** By explaining how they came to be friends

**Reading Item B—2011 Grade 5**

**B** Identify two times in the passage when Hayden is surprised by events.

Describe his reaction to each event using details from the passage.

**Reading Item B Scoring Rubric—2011 Grade 5**

<b>Score</b>	<b>Description</b>
<b>4</b>	The response identifies two times in the passage when Hayden is surprised by events and describes his reaction to each event using accurate and relevant details from the passage.
<b>3</b>	The response identifies two times in the passage when Hayden is surprised by events and describes his reaction to one of the events using accurate and relevant details from the passage.
<b>2</b>	<p>The response identifies one time in the passage when Hayden is surprised by events and describes his reaction to the event using accurate and relevant details from the passage.</p> <p style="text-align: center;"><b>OR</b></p> <p>The response identifies two times in the passage when Hayden is surprised by events.</p> <p style="text-align: center;"><b>OR</b></p> <p>The response describes Hayden’s reaction to each event using accurate and relevant details from the passage.</p>
<b>1</b>	<p>The response identifies one time in the passage when Hayden is surprised by events.</p> <p style="text-align: center;"><b>OR</b></p> <p>The response describes Hayden’s reaction to one event using accurate and relevant details from the passage.</p> <p style="text-align: center;"><b>OR</b></p> <p>The response demonstrates minimal understanding of the question.</p>
<b>0</b>	The response is incorrect or irrelevant.
<b>B</b>	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” is assigned for the item.)

## Acknowledgments

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## WRITING PROMPT

You have been asked to write a story for your principal. You must write about this topic:

### What is a happy time you will always remember?

Before you begin to write, think about the happy times you have had and choose **one** to write about. What made this a happy time? Why will you always remember it?

Now write a story about a happy time that you will always remember. Be sure to tell what happened and give enough detail so that your principal will understand.

## WRITER'S CHECKLIST

- |   |  |
|---|--|
| <p>1. Look at the ideas in your response.</p> <p><input type="checkbox"/> Have you focused on one main idea?</p> <p><input type="checkbox"/> Have you used enough detail to explain yourself?</p> <p><input type="checkbox"/> Have you put your thoughts in order?</p> <p><input type="checkbox"/> Can others understand what you are saying?</p> <p>2. Think about what you want others to know and feel after reading your paper.</p> <p><input type="checkbox"/> Will others understand how you think or feel about an idea?</p> <p><input type="checkbox"/> Will others feel angry, sad, happy, surprised, or some other way about your response? (Hint: Make your reader feel like you do about your paper's subject.)</p> <p><input type="checkbox"/> Do you have sentences of different lengths? (Hint: Be sure you have a variety of sentence lengths.)</p> | <p><input type="checkbox"/> Are your sentences alike? (Hint: Use different kinds of sentences.)</p> <p>3. Look at the words you have used.</p> <p><input type="checkbox"/> Have you described things, places and people the way they are? (Hint: Use enough detail.)</p> <p><input type="checkbox"/> Are you the same person all the way through your paper? (Hint: Check your verbs and pronouns.)</p> <p><input type="checkbox"/> Have you used the right words in the right places?</p> <p>4. Look at your handwriting.</p> <p><input type="checkbox"/> Can others read your handwriting with no trouble?</p> |
|---|--|

<b>Domain Scoring Rubric</b>
------------------------------

**Content (C)**

The Content domain includes the focusing, structuring, and elaborating that a writer does to construct an effective message for a reader. It is the creation of a product, the building of a composition intended to be read. The writer crafts his/her message for the reader by focusing on a central idea, providing elaboration of the central idea, and delivering the central idea and its elaboration in an organized text. Features are:

- Central idea
- Elaboration
- Unity
- Organization

**Style (S)**

The Style domain comprises those features that show the writer purposefully shaping and controlling language to affect readers. This domain focuses on the vividness, specificity, and rhythm of the piece and the writer's attitude and presence. Features are:

- Selected vocabulary
- Sentence variety
- Tone
- Voice
- Selected information

**Sentence Formation (F)**

The Sentence Formation domain reflects the writer's ability to form competent, appropriately mature sentences to express his/her thoughts. Features are:

- Completeness
- Absence of fused sentences
- Expansion through standard coordination and modifiers
- Embedding through standard subordination and modifiers
- Standard word order

**Usage (U)**

The Usage domain comprises the writer's use of word-level features that cause written language to be acceptable and effective for standard discourse. Features are:

- Standard inflections
- Agreement
- Word meaning
- Conventions

**Mechanics (M)**

The Mechanics domain includes the system of symbols and cueing devices a writer uses to help readers make meaning. Features are:

- Capitalization
- Punctuation
- Formatting
- Spelling

**Scoring Scale**

Each domain is scored independently using the following scale.

4 =The writer demonstrates **consistent**, though not necessarily perfect, control\* of almost all of the domain's features.

3 =The writer demonstrates **reasonable**, but not consistent, control\* of most of the domain's features, indicating some weakness in the domain.

2 =The writer demonstrates **inconsistent** control\* of several of the domain's features, indicating significant weakness in the domain.

1 =The writer demonstrates **little** or **no** control\* of most of the domain's features.

\*Control: The ability to use a given feature of written language effectively at the appropriate grade level. A response receives a higher score to the extent that it demonstrates control of the features in each domain.

The application of the scale, using actual student writing, is done with the assistance of a committee of Arkansas teachers, language arts supervisors, and representatives of the Arkansas Department of Education.

**Nonscoreable and Blank Papers**

Nonscoreable papers include student responses that are off-topic, illegible, incoherent, written in a language other than English, or too brief to assess. Nonscoreable papers will receive a score of "0." Blank papers indicate no response was written and will be reported as NA (no attempt), which translates into a score of "0."

**PART III Item Correlation with Curriculum Framework—Grade 5**

**The Arkansas Science Curriculum Framework\***

Strands	Content Standards	Student Learning Expectations
1— Nature of Science (NS)	1. Characteristics and Processes of Science: Students shall demonstrate and apply knowledge of the characteristics and processes of science using appropriate safety procedures, equipment, and technology.	2. Identify and define components of <i>experimental design</i> used to produce <i>empirical evidence</i> : <ul style="list-style-type: none"> <li>• <i>hypothesis</i></li> <li>• replication</li> <li>• sample size</li> <li>• appropriate use of control</li> <li>• use of standardized <i>variables</i></li> </ul> 4. Interpret scientific data using <ul style="list-style-type: none"> <li>• data tables/charts</li> <li>• bar graphs</li> <li>• circle graphs</li> <li>• line graphs</li> <li>• <i>stem and leaf plots</i></li> <li>• Venn diagrams</li> </ul> 5. Communicate results and conclusions from scientific inquiry. 8. Explain the role of observation in the development of a theory.
2— Life Science (LS)	2. Living Systems: Characteristics, Structure, and Function: Students shall demonstrate and apply knowledge of living systems using appropriate safety procedures, equipment, and technology	1. Compare the <i>cell theory</i> to the characteristics of a scientific <i>theory</i> . 5. Compare and contrast plant and animal <i>cells</i> . 10. Conduct investigations demonstrating the process of <i>cellular respiration</i> .
	4. Populations and Ecosystems: Students shall demonstrate and apply knowledge of populations and ecosystems using appropriate safety procedures, equipment, and technology.	2. Identify the transfer of <i>energy</i> using <i>energy pyramids</i> : <ul style="list-style-type: none"> <li>• terrestrial</li> <li>• aquatic</li> </ul> 4. Evaluate food webs under conditions of stress: <ul style="list-style-type: none"> <li>• overgrazing</li> <li>• overpopulation</li> <li>• natural disaster</li> <li>• introduction of non-native <i>species</i></li> <li>• human impact/urban development.</li> </ul> 7. Describe and diagram the <i>carbon cycle</i> in <i>ecosystems</i> . 8. Describe and diagram the <i>carbon dioxide-oxygen cycle</i> in <i>ecosystems</i> . 11. Create <i>ecosystems</i> in which plants can exist without animals. 13. Construct, compare, and contrast <i>environments</i> in <i>open</i> and <i>closed</i> aquaria. 15. Conduct <i>field studies</i> identifying and categorizing <i>organisms</i> in a given area of an ecosystem. 16. Evaluate positive and negative human effects on <i>ecosystems</i> .

\* The Content Standards and Student Learning Expectations listed are those that specifically relate to the released and non-released test items in this booklet

The Arkansas Science Curriculum Framework\* (continued)

Strands	Content Standards	Student Learning Expectations
3— Physical Science (PS)	5. Matter: Properties and Changes: Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology	2. Conduct <i>scientific investigations</i> on <i>physical properties</i> of objects. 3. Identify common examples of <i>physical properties</i> : <ul style="list-style-type: none"> <li>• length</li> <li>• <i>mass</i></li> <li>• area</li> <li>• perimeter</li> <li>• texture</li> <li>• taste</li> <li>• odor</li> <li>• color</li> <li>• elasticity</li> </ul> 4. State characteristics of physical changes. 10. Investigate scientists, careers, and historical breakthroughs related to <i>physical properties</i> , physical changes, and states of <i>matter</i> .
	6. Motion and Forces: Students shall demonstrate and apply knowledge of motion and <i>forces</i> using appropriate safety procedures, equipment, and technology	2. Conduct investigations using <ul style="list-style-type: none"> <li>• levers (e.g., toothbrush)</li> <li>• pulleys</li> <li>• inclined planes-ramps, wedges, and screws</li> <li>• wheels and axles</li> </ul> 3. Relate <i>simple machines</i> to inventions and discoveries. 7. Investigate careers, scientists, and historical breakthroughs related to <i>simple machines</i> and <i>potential</i> and <i>kinetic energy</i> .
	7. Energy and Transfer of Energy: Students shall demonstrate and apply knowledge of energy and transfer of energy using appropriate safety procedures, equipment, and technology	1. Summarize how light can interact with <i>matter</i> through <i>absorption</i> , <i>refraction</i> , and <i>reflection</i> . 2. Investigate how light travels and interacts with an object or material.
4— Earth and Space Science (ES)	8. Earth Systems: Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology	1. Identify some basic <i>elements</i> composing minerals: <ul style="list-style-type: none"> <li>• silicon</li> <li>• oxygen</li> <li>• iron</li> <li>• sodium</li> <li>• chlorine</li> <li>• calcium</li> <li>• carbon</li> <li>• hydrogen</li> <li>• aluminum</li> </ul> 2. Investigate the growth of crystals. 6. Identify minerals found in Arkansas: <ul style="list-style-type: none"> <li>• bauxite</li> <li>• diamonds</li> <li>• quartz</li> <li>• galena</li> </ul> 7. Identify characteristics of <i>sedimentary</i> , <i>igneous</i> , and <i>metamorphic</i> rocks. 10. Investigate careers, scientists, and historical breakthroughs related to minerals and rocks. 11. Investigate the formation of soil. 12. Conduct investigations on sedimentation.
	9. Earth's History: Students shall demonstrate and apply knowledge of Earth's history using appropriate safety procedures, equipment, and technology	1. Explain and give examples of how physical <i>evidence</i> from <i>fossils</i> supports the <i>theory</i> that Earth has changed over time. 2. Analyze <i>fossil record evidence</i> about plants and animals that lived long ago.
	10. Objects in the Universe: Students shall demonstrate and apply knowledge of objects in the universe using appropriate safety procedures, equipment, and technology	4. Distinguish between <i>mass</i> and <i>weight</i> . 6. Investigate careers, scientists, and historical breakthroughs related to planets.

\* The Content Standards and Student Learning Expectations listed are those that specifically relate to the released and non-released test items in this booklet

**Released Items for Science\***

<b>Item</b>	<b>Strand</b>	<b>Content Standard</b>	<b>Student Learning Expectation</b>
1	L	2	10
2	P	6	2
3	E	10	4
4	L	4	2
5	P	6	2
6	L	4	4
7	P	6	3
8	E	8	1
9	P	6	2
10	E	8	6
11	P	6	7
12	E	8	6
13	L	4	8
14	N	1	5
15	L	4	15
16	E	8	11
17	L	4	16
18	E	9	2
19	L	4	7
20	E	10	6
A	L	2	5
B	E	9	1

\* Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Science items.

**Non-Released Items for Science\***

<b>Strand</b>	<b>Content Standard</b>	<b>Student Learning Expectation</b>
P	5	10
E	8	2
L	4	2
N	1	8
E	8	12
E	8	11
L	2	1
L	4	11
L	4	13
N	1	5
L	4	4
P	5	3
P	7	2
E	8	7
E	8	10
P	5	2
P	5	4
P	7	1
N	1	2
N	1	4
P	6	2
P	5	3
N	1	5

\* Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Science items.

The Arkansas Mathematics Curriculum Framework\*

Strands	Content Standards	Student Learning Expectations
<p>1—Number and Operations (NO)</p>	<p>1. Number Sense: Students shall understand numbers, ways of representing numbers, relationships among numbers and number systems.</p>	<p>1. Use models and visual representations to develop the concepts of the following:  <u>Fractions:</u></p> <ul style="list-style-type: none"> <li>• parts of unit wholes</li> <li>• parts of a collection</li> <li>• locations on number lines</li> <li>• locations on ruler (<i>benchmark fractions</i>)</li> <li>• divisions of whole</li> <li>• numbers</li> </ul> <p><u>Ratios:</u></p> <ul style="list-style-type: none"> <li>• part-to-part (2 boys to 3 girls)</li> <li>• part-to-whole (2 boys to 5 people)</li> </ul> <p><u>Percents:</u></p> <ul style="list-style-type: none"> <li>• part-to-100</li> </ul> <p>2. Develop understanding of decimal place value using models.</p> <p>5. Use <i>models of benchmark fractions</i> and their <i>equivalent</i> forms:</p> <ul style="list-style-type: none"> <li>• to analyze the size of fractions</li> <li>• to determine that simplification does not change the value of the fraction</li> <li>• to convert between mixed numbers and improper fractions</li> </ul>
	<p>2. Properties of Number Operations: Students shall understand meanings of operations and how they relate to one another.</p>	<p>2. Identify <i>commutative</i> and <i>associative properties</i>.</p> <p>4. Apply rules (conventions) for <i>order of operations</i> to <i>whole numbers</i> where the left to right computations are modified only by the use of parentheses.</p>
	<p>3. Numerical Operations and Estimation: Students shall compute fluently and make reasonable estimates.</p>	<p>1. Develop and use a variety of <i>algorithms</i> with <i>computational fluency</i> to perform <i>whole number</i> operations using addition and subtraction (up to <i>five-digit</i> numbers), multiplication (up to <i>three-digit</i> x <i>two-digit</i>), division (up to <i>two-digit</i> divisor) interpreting remainders, including real world problems.</p> <p>3. Solve, with and without appropriate <i>technology</i>, two-step problems using a variety of methods and tools (i.e. objects, mental computation, paper and pencil).</p>
<p>2—Algebra (A)</p>	<p>4. Patterns, Relations, and Functions: Students shall recognize, describe, and develop patterns, relations, and functions.</p>	<p>1. Solve problems by finding the next term or missing term in a <i>pattern</i> or <i>function</i> table using real world situations.</p> <p>2. Interpret and write a rule for a one operation <i>function table</i>                      Ex. adding 3.</p>
	<p>5. Algebraic Representations: Students shall represent and analyze mathematical situations and structures using algebraic symbols.</p>	<p>1. Model and solve simple <i>equations</i> by informal methods using manipulatives and appropriate <i>technology</i>.</p> <p>2. Write <i>expressions</i> containing one <i>variable</i> (a letter representing an unknown quantity) using rules for addition and subtraction.</p> <p>3. Select, write and evaluate <i>algebraic expressions</i> with one <i>variable</i> by substitution.                      Ex. Evaluate <math>x+4</math> if <math>x=7</math></p>
	<p>6. Algebraic Models: Students shall develop and apply mathematical models to represent and understand quantitative relationships.</p>	<p>1. Draw conclusions and make predictions, with and without appropriate <i>technology</i>, from models, tables and <i>line graphs</i>.</p>
	<p>7. Analysis of Change: Students shall analyze change in various contexts.</p>	<p>1. Model and describe quantities that change using real world situations                      Ex. age and height.</p>

\* The Content Standards and Student Learning Expectations listed are those that specifically relate to the released and non-released test items in this booklet

The Arkansas Mathematics Curriculum Framework\* (continued)

Strands	Content Standards	Student Learning Expectations
3—Geometry (G)	8. Geometric Properties: Students shall analyze characteristics and properties of 2- and 3-dimensional geometric shapes and develop mathematical arguments about geometric relationships.	<ol style="list-style-type: none"> <li>1. Identify and model regular and <i>irregular polygons</i> including decagon.</li> <li>2. Identify and draw <i>congruent, adjacent, obtuse, acute, right</i> and <i>straight</i> angles (Label parts of an angle: <i>vertex, rays, interior</i> and <i>exterior</i>).</li> <li>3. Model and identify circle, <i>radius, diameter, center, circumference</i> and <i>chord</i>.</li> <li>4. Model and identify the properties of <i>congruent</i> figures.</li> </ol>
	9. Transformation of Shapes: Students shall apply transformations and the use of symmetry to analyze mathematical situations	<ol style="list-style-type: none"> <li>1. Predict and describe the results of <i>translation (slide), reflection (flip), rotation (turn)</i>, showing that the transformed shape remains unchanged.</li> </ol>
	10. Coordinate Geometry: Students shall specify locations and describe spatial relationships using coordinate geometry and other representational systems.	<ol style="list-style-type: none"> <li>1. Use geometric vocabulary (<i>horizontal/x-axis, vertical/y-axis, ordered pairs</i>) to describe the location and plot points in <i>Quadrant I</i>.</li> </ol>
	11. Visualization and Geometric Models: Students shall use visualization, spatial reasoning, and geometric modeling.	<ol style="list-style-type: none"> <li>1. Using grid paper, draw and identify <i>two-dimensional patterns (nets)</i> for <i>cubes</i>.</li> </ol>
4—Measurement (M)	12. Physical Attributes: Students shall use attributes and tools of measurement to describe and compare mathematical and real-world objects.	<ol style="list-style-type: none"> <li>1. Identify and select appropriate units and tools to measure. Ex. angles with degrees, distance with feet</li> <li>2. Make conversions within the customary measurement system in real world problems. Ex. hours to minutes, feet to inches, quarts to gallons, etc.</li> <li>3. Establish through experience benchmark prefixes of milli-, centi-, and kilo-.</li> <li>4. Understand when to use linear units to describe <i>perimeter</i>, square units to describe <i>area</i> or <i>surface area</i>, and cubic units to describe <i>volume</i>, in real world situations.</li> <li>5. Model the differences between covering the <i>faces (surface area/nets)</i> and filling the <i>interior (volume of cubes)</i>.</li> </ol>
	13. Systems of Measurement: Students shall identify and use units, systems, and processes of measurement.	<ol style="list-style-type: none"> <li>1. Solve real world problems involving one <i>elapsed time</i>, counting forward (calendar and clock).</li> <li>2. Determine which unit of measure or measurement tool matches the context for a problem situation.</li> <li>4. Develop and use <i>strategies</i> to solve real world problems involving <i>perimeter</i> and <i>area</i> of rectangles.</li> <li>6. Use benchmark angles to estimate the measure of angles Ex. 45 degrees, 90 degrees, 120 degrees, 180 degrees.</li> </ol>
5—Data Analysis and Probability (DAP)	14. Data Representation: Students shall formulate questions that can be addressed with data, and collect, organize, and display relevant data to answer them.	<ol style="list-style-type: none"> <li>1. Develop appropriate questions for surveys.</li> <li>2. Collect <i>numerical</i> and <i>categorical data</i> using surveys, observations and experiments that would result in <i>bar graphs, line graphs, line plots</i> and <i>stem-and-leaf plots</i>.</li> <li>3. Construct and interpret <i>frequency tables, charts, line plots, stem-and-leaf plots</i> and <i>bar graphs</i>.</li> </ol>
	15. Data Analysis: Students shall select and use appropriate statistical methods to analyze data.	<ol style="list-style-type: none"> <li>1. Interpret graphs such as <i>line graphs, double bar graphs, and circle graphs</i>.</li> <li>2. Determine, with and without appropriate <i>technology</i>, the <i>range, mean, median</i> and <i>mode (whole number data sets)</i> and explain what each indicates about the set of data.</li> </ol>
	16. Inferences and Predictions: Students shall develop and evaluate inferences and predictions that are based on data.	<ol style="list-style-type: none"> <li>1. Make predictions and justify conclusions based on data.</li> </ol>
	17. Probability: Students shall understand and apply basic concepts of probability.	<ol style="list-style-type: none"> <li>1. Identify and predict the <i>probability</i> of events within a simple experiment.</li> <li>2. List and explain all possible <i>outcomes</i> in a given situation.</li> </ol>

\* The Content Standards and Student Learning Expectations listed are those that specifically relate to the released and non-released test items in this booklet

**Released Items for Mathematics\***

<b>Item</b>	<b>Strand</b>	<b>Content Standard</b>	<b>Student Learning Expectation</b>
1	A	5	1
2	D	16	1
3	M	13	2
4	A	5	3
5	D	14	1
6	G	8	4
7	M	12	4
8	D	16	1
9	M	13	6
10	A	4	1
11	M	12	3
12	D	17	1
13	A	7	1
14	G	11	1
15	M	12	5
16	A	5	2
17	G	10	1
18	D	15	1
19	G	8	1
20	M	13	1
A	D	17	2
B	G	8	3
C	N	1	5

\* Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Mathematics items.

## Non-Released Items for Mathematics\*

Strand	Content Standard	Student Learning Expectation
D	14	2
G	8	2
A	5	3
M	13	4
G	9	1
A	6	1
N	2	4
A	6	1
G	8	4
G	9	1
A	4	2
M	12	2
D	14	3
N	3	3
N	3	1
N	1	1
M	12	1
D	15	2
N	2	2
N	3	1
N	3	3
N	1	2

\* Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Mathematics items.

**The Arkansas English Language Arts Curriculum Framework—Reading Strand\***

Content Standards	Student Learning Expectations
<p>9. Comprehension: Students shall apply a variety of strategies to read and comprehend printed material.</p>	<p>4. Generate questions relevant to text and topics.                      6. Connect own background knowledge and personal experience to make inferences and to respond to new information presented in text.                      7. Make inferences supported by a character's thoughts, words and actions, or the narrator's description.                      8. Analyze literary elements of character, plot, and setting.                      10. Distinguish among facts and inferences supported by evidence and opinions in text.                      11. Use such comprehension strategies as establishing purpose, inferring, and summarizing, to determine essential information.                      13. Use the <i>text features</i> to locate and recall information, with emphasis on fonts/effects and illustrations/photographs.                      14. Use knowledge of text structure(s) to enhance understanding with emphasis on sequence and description.                      15. Classify and organize text information by level of importance in a variety of ways, including timelines and graphic organizers, to support and explain ideas.                      16. Scan materials to locate specific information.                      17. Skim materials to develop a general overview.                      21. Evaluate personal, social, and political issues as presented in text.</p>
<p>10. Variety of Text: Students shall read, examine, and respond to a wide range of texts for a variety of purposes.</p>	<p>3. Vary reading strategies according to text and purpose.                      5. Identify cause/effect and problem/solution relationships.                      8. Locate information to support opinions, predictions, and conclusions.                      14. Use graphic organizers to analyze information.</p>
<p>11. Vocabulary, Word Study, and Fluency: Students shall acquire and apply skills in vocabulary development and word analysis to be able to read fluently.</p>	<p>5. Use context to determine meaning of multiple meaning words.                      8. Identify figurative language such as idioms, similes and metaphors.                      10. Use context clues to select appropriate dictionary definition.</p>

\* The Content Standards and Student Learning Expectations listed are those that specifically relate to the released and non-released test items in this booklet

## Released Items for Reading\*

Item	Strand	Content Standard	Student Learning Expectation
1	R	10	5
2	R	11	10
3	R	9	14
4	R	10	8
5	R	10	14
6	R	9	10
7	R	9	4
8	R	9	14
9	R	9	8
10	R	9	8
11	R	11	8
12	R	11	5
13	R	9	7
14	R	9	21
15	R	11	8
16	R	9	17
A	R	9	11
B	R	9	7

\* Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the English Language Arts items.

**Non-Released Items for Reading\***

<b>Strand</b>	<b>Content Standard</b>	<b>Student Learning Expectation</b>
R	9	7
R	10	3
R	11	8
R	9	13
R	9	16
R	9	6
R	10	8
R	10	8
R	9	15

\* Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the English Language Arts items.

The Arkansas English Language Arts Curriculum Framework—Writing Strand\*

Content Standards	Student Learning Expectations
<p>4. Process: Students shall employ a wide range of strategies as they write and use different writing process elements appropriately.</p>	<p>8. Revise content for</p> <ul style="list-style-type: none"> <li>• Central Idea</li> <li>• Organization (e.g., beginning, middle, and end; sequencing ideas; major points of information, etc.)</li> <li>• Unity</li> <li>• Elaboration</li> <li>• Clarity</li> </ul> <p>11. Edit individually or in groups for appropriate grade-level conventions, within the following features:</p> <ul style="list-style-type: none"> <li>• Sentence formation                             <ul style="list-style-type: none"> <li>• Completeness</li> <li>• Absence of fused sentences</li> <li>• Expansion through standard coordination and modifiers</li> <li>• <i>Embedding</i> through standard subordination and modifiers</li> <li>• Standard word order</li> </ul> </li> <li>• Usage                             <ul style="list-style-type: none"> <li>• Standard inflections</li> <li>• Agreement</li> <li>• Word meaning</li> <li>• Conventions</li> </ul> </li> <li>• <i>Mechanics</i> <ul style="list-style-type: none"> <li>• Capitalization</li> <li>• Punctuation</li> <li>• Formatting</li> <li>• Spelling</li> </ul> </li> </ul>
<p>6. Conventions: Students shall apply knowledge of Standard English conventions in written work.</p>	<p>8. Spell words by applying the correct spelling of roots, bases, and affixes.</p>

\* The Content Standards and Student Learning Expectations listed are those that specifically relate to the released and non-released test items in this booklet

**Non-Released Items for Writing\***

<b>Strand</b>	<b>Content Standard</b>	<b>Student Learning Expectation</b>
W	6	8
W	4	11
W	4	8
W	4	11

\* Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Writing items.

# ACTAAP

Arkansas Comprehensive Testing, Assessment, and Accountability Program

DEVELOPED FOR THE ARKANSAS DEPARTMENT OF EDUCATION, LITTLE ROCK, AR 72201

AR1102



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